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MICROPALAEONTOLOGY NOTEBOOK

A new dinoflagellate cyst from the Upper Bathonian (Middle Jurassic) strata of the Russian Platform

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ABSTRACT – *Protobatioladinium? elongatum* sp. nov. is a distinctive, large, longitudinally elongate Upper Bathonian (Middle Jurassic) dinoflagellate cyst recorded from western Russia. This species is questionably attributed to *Protobatioladinium* because the archaeopyle type does not precisely conform to that of the genotype. This form is present, often abundantly, throughout the Upper Bathonian sediments of the central and northern Russian Platform and appears to be a reliable marker species.

INTRODUCTION

As part of a study of the Middle Jurassic marine microplankton of the central Russian Platform and the Timan-Pechora Basin, northwest Russia, significant numbers of an undescribed dinoflagellate cyst, questionably attributed to *Protobatioladinium* Nøhr-Hansen 1986, were recorded from Upper Bathonian sediments. This characteristically longitudinally elongate form is a key marker taxon for the late Bathonian strata of the Russian Platform and is herein described as *Protobatioladinium? elongatum* sp. nov.

SYSTEMATIC PALAEONTOLOGY

Division **Dinoflagellata** (Bütschli, 1885) Fensome *et al.*, 1993
Class **Dinophyceae** Pascher, 1914
Order **Gonyaulacales** Taylor, 1980
Family **Pareodiniaceae** Gocht, 1957
Genus ***Protobatioladinium*** Nøhr-Hansen, 1986
Protobatioladinium? elongatum sp. nov.
Fig. 1a–d

Derivation of name. From the longitudinally elongate nature of this species.

Diagnosis. Proximate, acavate, slender, markedly longitudinally elongate dinoflagellate cysts, questionably attributed to *Protobatioladinium* and intermediate to large in size (of Stover & Evitt, 1978). The ambitus is elongate ovoidal with a large, prominent, elongate apical horn (up to 41.4 μm in length) and normally a smaller antapical horn. The horns are hollow and evenly distally tapering. The apical horn has a sharply pointed, simple distal extremity; the distal portion of the antapical horn is either sharply pointed or rounded. The antapical horn is consistently offset toward the ventral side of the cyst. The species is not significantly dorso-ventrally flattened and the dorsal portion of the hypocyst may form a distinctive protrusion or bulge in lateral or oblique lateral views. The epicyst is normally longer than the hypocyst, assuming that the broadest part of the cyst is the paracingular area. The epicyst and hypocyst may be of similar lengths in certain specimens however. Autophragm thin and smooth. Archaeopyle anterior intercalary, apparently type (2I). The apparently single opercular piece comprises Kofoidian paraplates 1a and 2a and is free. No archaeopyle sutures have been observed within the apical paraplate series. The archaeopyle is the only manifestation of paratabulation, as the paracingulum and parasulcus are not indicated.

Holotype. Figure 1a, specimen MPK 10143. Sample VII 3953, an Upper Bathonian mudstone (bed 18), taken from core at 74.00 m in Borehole 132, near Elatma in the River Oka Basin, Moscow Syncline, central Russia (Riding & Ilyina, 1996, fig. 2). Housed in the palynological collections of the British Geological Survey, Keyworth, Nottingham, UK.

Dimensions (μm).

	Minimum	(Mean)	Maximum
Overall length of cyst	87.1	(103.4)	120.7
Overall maximum width of cyst	24.1	(29.3)	34.5

34 specimens measured

The length and maximum width of the holotype are 102.1 μm and 31.6 μm respectively.

Stratigraphical and geographical distribution. *Protobatioladinium? elongatum* sp. nov. is present, frequently abundantly, in the Upper Bathonian strata of the Moscow Syncline and the the Ryazan Saratov Trough of the central Russian Platform and in the Upper Bathonian sediments of the Timan–Pechora Basin, northern Russia (Ilyina, 1991). The species has been observed to attain 75% of the dinoflagellate cyst association; the average figure, however, is 31.6%.

Comparison. *Protobatioladinium? elongatum* sp. nov. is similar in overall morphology and geographical/stratigraphical distribution to the morphologically similar *Protobatioladinium elatmaensis* Riding & Ilyina, 1996. The length and width of *Protobatioladinium elatmaensis* are, however, significantly lesser and greater, respectively, than these parameters in *Protobatioladinium? elongatum* sp. nov. Furthermore, the archaeopyle of *Protobatioladinium elatmaensis* is combination, type (tA)+(2I). Riding & Ilyina (1996) gave comparisons of *Protobatioladinium elatmaensis* and the remaining four Upper Jurassic-lowermost Cretaceous species in this genus. These comparisons are also applicable to *Protobatioladinium? elongatum*.

Remarks. The new dinoflagellate cyst species *elongatum* described herein is questionably attributed to the genus *Protobatioladinium* as the archaeopyle is apparently of anterior intercalary style, type (2I). *Protobatioladinium* has a compound combination archaeopyle, type (tA)+2I (Nøhr-Hansen, 1986; Riding & Ilyina, 1996). However, the co-occurrence with *Protobatioladinium elatmaensis* means that *elongatum* almost certainly belongs in *Protobatioladinium*. Furthermore, *Protobatioladinium elatmaensis* often appears to have an anterior intercalary, type (2I), archaeopyle (Riding & Ilyina, 1996, figs 1a, c). *Protobatioladinium? elongatum* sp. nov. has never been previously figured. However, the species was erroneously referred to *Kalyptea diceras* Cookson & Eisenack, 1960 by Ilyina (1991), who erected the Upper Bathonian *Kalyptea diceras* dinoflagellate cyst zone. The species *Protobatioladinium? elongatum* sp. nov. and *P. elatmaensis* are the oldest representatives of this genus; the four other species are confined to Upper Jurassic–lowermost Cretaceous sediments. The endemism of this species is entirely consistent with the markedly provincial nature of Bathonian dinoflagellate cyst associations.

Bathonian dinoflagellate cyst associations of the Russian Platform are of relatively low species diversity. In Lower and Middle Bathonian sediments, the assemblages are dominated by *Ctenidodinium sellwoodii* (Sarjeant, 1975) Stover & Evitt, 1978 or *Protobatioladinium elatmaensis* (see Riding & Ilyina, 1996). *Protobatioladinium? elongatum* sp. nov. is confined to the Upper Bathonian strata of the Moscow Syncline, the Ryazan Saratov Trough (central western Russia) and the Upper Bathonian sediments of the Timan–Pechora Basin (northern Russia). Associated Upper Bathonian dinoflagellate cysts in Borehole 132 near Elatma in the Moscow Syncline (mudstones with interbedded siltstones between 74.00 m and 62.80 m) comprise *Batiacasphaera* spp., *Dissiliodinium* sp., *Mendicodinium groenlandicum* (Pocock & Sarjeant, 1972) Davey, 1979, *Pareodinia ceratophora* Deflandre, 1947 and *Protobatioladinium elatmaensis*. Similar associations were recovered from Upper Bathonian mudstones of the nearby Borehole 121, Lasicyi (Riding & Ilyina, 1996, fig. 2). In the Upper Bathonian mudstones (*Cadoceras variabile* Zone) of the River Pizhma area, Timan -Pechora region, northern Russian Platform, *Protobatioladinium? elongatum* sp. nov. occurs together with slightly more diverse dinoflagellate cyst associations. These assemblages comprise *Batiacasphaera* spp., *Chytroeisphaeridia hyalina* (Raynaud, 1978) Lentin & Williams, 1981, *Dissiliodinium* spp., *Fromea tornatilis* (Drugg, 1978) Lentin & Williams, 1981, *?Korystocysta* sp., *Lithodinia* spp., *Nannoceratopsis pellucida* Deflandre, 1938, *Pareodinia ceratophora*, *Protobatioladinium elatmaensis*, *?Sirmiodinium grossii* Alberti, 1961, *Tubotuberella dangeardii* (Sarjeant, 1968) Stover & Evitt, 1978 and *Wanaea acollaris* Dodekova, 1975. The Boreal latest Bathonian *Cadoceras variabile* (ammonite) Zone is approximately the correlative of the European latest Bathonian *Clydoniceras discus* Zone.

References for the author citations of the dinoflagellate species mentioned herein may be found in Lentin & Williams (1993).

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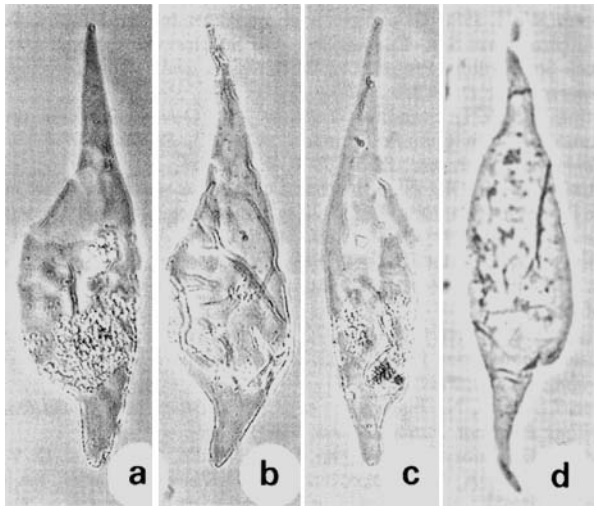

Fig. 1. *Protobatioladinium? elongatum* sp. nov. All photomicrographs taken using phase contrast, magnification ×500. Specimens from the Upper Bathonian sediments of Borehole 132, near Elatma, Russian Platform. All specimens housed in the palynological collections of the British Geological Survey, Keyworth, Nottingham, UK. **(a)** Sample VII 3953, 74.00 m depth. The holotype, specimen MPK 10143 in oblique dorsal/right lateral view. Note the elongate apical horn, the anterior intercalary archaeopyle and the sub-equatorial protuberance in the posterior intercalary region. **(b)** Sample details as (a). A topotype, specimen MPK 10144 in oblique right lateral view. Note the archaeopyle and the relatively small antapical horn. **(c)** Sample details as (a). A topotype, specimen MPK 10601 in left lateral view. Note the slender, longitudinally elongate cyst organization, the archaeopyle and the small posterior intercalary bulge. **(d)** Sample VII 3960, 65.00 m depth. A paratype, specimen MPK 10141 in left lateral view. Note the unusually homomorphic horns and the apparent absence of an archaeopyle.